ENERGY FACT SHEET

Kentucky Natural Resources & Environmental Protection Cabinet

Greenhouse Gases in Kentucky

Inventory and Policy Options for Reductions

Energy from the sun heats the earth's surface, and the earth radiates heat back into space. Greenhouse gases (water vapor, carbon dioxide, and other gases) in the atmosphere trap some of the outgoing heat–retaining it the same way glass panels do in a greenhouse.

Without this natural greenhouse effect, temperatures would be too cold to support life. However, human activities are adding more greenhouse gases (GHGs) to the atmosphere and may be increasing this natural greenhouse effect. Although debate on the issue continues, many scientists believe that the buildup of greenhouse gases is causing global temperatures to rise. If global warming is occurring, in the long run it could have harmful effects on the environment, agriculture, human health, and the economy.

The Kentucky Division of Energy received a grant from the U.S. Environmental Protection Agency (EPA) to conduct a two-phase study of GHGs in Kentucky. The purpose of Phase I was to estimate the sources and amounts of GHGs produced in Kentucky in 1990. Phase II developed a range of policy options for reducing the amount of GHGs in future years. The division contracted with Dr. Hugh T. Spencer, University of Louisville, to conduct the study. A technical advisory committee, with representatives from several key sectors, worked with Dr. Spencer in the study effort.

Two reports were issued: *Phase I–Kentucky Greenhouse Gas Inventory: Estimated Emissions and Sinks for the Year 1990* and *Phase II–Climate Change Mitigation Strategies for Kentucky: Policy Options for Controlling Greenhouse Gas Emissions Through the Year 2020*.

Kentucky Greenhouse Gas Inventory

The major sources of GHG emissions in Kentucky for 1990, organized by rank and economic sector, are listed below. The first six sources account for a little more than 91 percent of the emissions. Electrical utilities are at the top of the list. Coal is the main utility fuel in Kentucky, and thus a major source of GHG emissions. Refrigerant (CFCs and related compounds) manufacture and use is next, followed by the use of fossil fuels in transportation. Methane release during coal mining, the industrial and residential use of fossil fuels, and forest removal follow. The growth of trees, which absorbs CO_2, reduces the total amount of GHGs.

Table 1–Major Sources and Amounts of Greenhouse Gases (GHGs) in Kentucky, 1990

Source and Type of Gas*	Emissions (in millions of tons)	Emissions (million of tons of CO_2 equivalent)	Percent of Total
Electricity generation, CO_2	76.7	76.7	37.3
Refrigerants, CFCs	0.013	39.3	19.1
Transportation, CO_2	28.9	28.9	14.1
Coalbed methane, CH_4	0.9	19.8	9.6
Industrial fuel use, CO_2	16.7	16.7	8.1
Residential fuel use, CO_2	5.6	5.6	2.9
Forest removal, CO_2	4.0	4.0	2.0
Other sources, various gases	NA	14.5	6.9
Total	NA	205.5	100
Growth of Trees, (CO_2)	(38.2)	(38.2)	
Net emissions	NA	167.3	

* CO_2 = Carbon Dioxide; CFCs = Chlorofluorocarbons; CH_4 = Methane

Policy Options for Controlling Greenhouse Gas Emissions Through the Year 2020

GHG emissions in Kentucky are projected to increase significantly unless mitigating policies are implemented. A range of policy options have been suggested to reduce GHGs with positive, neutral, or at worst, only slightly negative economic impacts.

The policies are intended to be flexible so that they can be implemented at a modest level and then intensified if necessary. Table 2 lists the estimated annual GHG reductions of several policy options if implemented at a modest level or an intensified level. Several of these policies have significant potential to reduce GHG emissions, including:

- Improve forest management and timber production to increase carbon absorption by trees;
- Use clean coal technology and natural gas to generate electricity, replacing a number of existing conventional coal power plants;
- Reduce emissions of CFC manufacturing byproducts;
- Improve end-use efficiency in the industrial sector;
- Improve construction practices and enforce energy-related building codes in the commercial and residential sectors;
- Improve the energy efficiency of vehicles;
- Use solar energy and energy-efficient technologies in homes and businesses.

Conclusion

If the complete set of policy options were to be implemented in a vigorous and sustained manner, the sum of GHG reductions should be enough to bring Kentucky's emissions down to the 1990 level by the year 2020.

Table 2–Estimated Annual GHG Reductions at Modest and Intensified Levels of Implementation

Policy Option	Modest Implementation	Intensified Implementation
	(reductions in millions of tons of CO_2 equivalent)	
Rural forest management	2.8	17.1
Shift some electric generation to natural gas/gasified coal	3.7	11.0
Recovery of refrigerant byproduct	3.1	6.3
Expand industrial energy efficiency programs	0.1	5.5
Improve enforcement of building codes	0.8	3.3
Urban tree planting	0.3	2.7
Feebates for fuel-efficient vehicles	1.2	2.4
Increase recovery of landfill gas	0.7	1.4
Home Energy Rating System (HERS)	.07	0.5
Solar heating for low-temperature applications	.13	0.6
Energy efficiency in government buildings	.09	0.5
Coalbed methane recovery	.02	0.2
Other policies	0.2	0.3
Total	13.2	51.8

Both GHG study reports are available at no cost from the Kentucky Division of Energy.

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